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Notes on the Courtship and Mating Behavior of Certain Snakes

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The scarcity of descriptive knowledge of the courtship and mating behavior of snakes was made apparent in an arresting manner in D. Dwight Davis' excellent summary of the literature on this subject (1936). In this paper it was pointed out that existing information is not only limited but widely scattered, mostly in the form of brief notes, some of it in obscure and unsuspected places, and by and large uncorrelated and uninterpreted. Some descriptions of courtship and mating, noteworthy because of the detail in which they have been recorded by competent observers, have appeared in print more recently. Blanchard and Blanchard (1942) reported observations on a large number of garter snakes (*Thamnophis sirtalis sirtalis*) in confinement but under practically natural conditions and Breder (1946) reported on free snakes of the same subspecies. Carr and Carr (1942) described the courtship "dance" of the cottonmouth moccasin (*Agkistrodon piscivorus piscivorus*) as seen by them in the field near Gainesville, Florida.

Since it may be some time before significant correlations can be made, it is in order to record here a few more fragmentary observations, some of them second-hand, which may help to stimulate additional study when suitable opportunities are available.

Arizona Bull Snake, *Pituophis sayi affinis* Hallowell

A 72-inch female bull snake collected on June 7, 1946, at the Boyce Thompson Southwestern Arboretum near Superior, Arizona, was confined in a cloth bag with two males of the same subspecies. These males were about 60 and 48 inches long, respectively. A commotion in the bag caused us to liberate them on an enclosed porch about 1:00 P. M. the same day. The larger and stronger of the two males at once began biting the necks and bodies of the female and the smaller male. The female apparently did not react in any overt manner, but the smaller male seemed to be adversely stimulated and pulled away, although he stayed near the female.

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The female moved against the wall of the porch and remained quiet, while the larger male moved forward over her body, not following exactly all of her curves but working back and forth with his neck and body, occasionally turning his head sideways and biting her across the back and later across the neck. The bites were not gentle but the female showed no concern. This behavior continued for about ten minutes.

The male's cloaca eventually came alongside that of the female, whereupon the later turned sideways and a hemipenis was quickly inserted. Both snakes then remained quiet, the male looped transversely across the female, his head alongside her neck. There was no intertwining of bodies or tails.

The smaller male continued to move about the mating pair, attempting vainly to make contact with the female. He did not bite either of the other snakes. He was obviously in poor condition: emaciated, weakly aggressive, and definitely unable to compete with a more robust rival.

The copulation lasted about twenty minutes. Throughout this time, wave-like muscular spasms rippled down the sides of the posterior third of the male's body. His tail was firmly tumid for its entire length and curved upward.

About 7:00 P. M. that evening the female was again in copulation with the same male. Preliminary activities were not observed but the behavior during coitus was essentially the same as described above. The other male was passive and had retired to another corner. Two weeks later the female weighed 6 pounds and 7 ounces. She layed 22 apparently infertile eggs (averaging 35 by 51 mm.*) on July 7.

Prairie Rattlesnake, *Crotalus viridis viridis* (Rafinesque)

A stylized courtship performance or "dance," such as observed in detail in the cottonmouth moccasin by Carr and Carr (*op. cit.*), apparently has been infrequently noted in crotalid snakes. Davis (*op. cit.*, p. 267) describes such behavior, as observed by R. Marlin Perkins, among captive cottonmouths and Mexican west coast rattlesnakes (*Crotalus basiliscus*). Lowe (1942) observed such behavior in captive western diamond rattlesnakes (*Crotalus atrox*). A courtship "dance" was not noticed by Wood (1936) in the mating of prairie rattlesnakes, and A. M. Jackley, who has observed many mating pairs of this species in South Dakota, has told me that he has never witnessed it.

It may be of interest, therefore, to record some observations on the prairie rattlesnake by the late L. B. Gallaher of Harlowton, Montana. In a letter dated April 26, 1935, he told of finding two snakes of this species (both

*Measurements furnished by B. R. Tschambers of the Lincoln Park Zoological Garden, Chicago.

"over four feet long") in Rattlesnake . Canyon, about 8 miles south of Harlow-ton about 4:00 **P. M.** on April 20 of that year. The temperature was estimated at 70° F. He continued as follows:

"I was attracted to a movement down the canyon side about fifty feet below. [There *were*] two large snakes acting as though they were mating, but I do not think they did. They would stand up from the ground eighteen or twenty inches, bob their heads, and rub their necks together for a minute or two. Then the smaller would slip a coil or two about the upright part of the other and they would make a quick flop. As the hill was steep they would roll down a little way; then they would go all over it again. This went on for a good thirty minutes. They finally parted and the smaller one started back up the hill to some cracks in the rocks. As it was going to get away I went down and caught it. The other stayed where they were until I went after it. They had lots of life for this early [in the season], and the larger one was plenty tough."

These snakes were not segregated from others Mr. Gallaher sent to me at the same time. Whether the smaller, described as the more aggressive, was indeed the male could not be determined. Copulation seems not to have occurred. Whatever bearing this observation in April may have on the question of spring or fall mating (see Rahn, 1942), this was undoubtedly a "dance" pattern that may be regarded as courtship behavior.

Northern Copperhead, *Agkistrodon mokeson mokeson* (Daudin)

Apparently no description of a courtship "dance" in the copperhead has been recorded. I am therefore grateful to Joseph Ackroyd of Moorestown, New Jersey, for the privilege of including here an account of his observations on this species near Winchester, Virginia, in late July, 1945, as recounted in a letter dated September 6 of that year.

"The dance took place at **10:30 P. M.** at the side of a farm lane bordered on one side by an uncleared fence row and wild blackberry patch and on the other by a long, wild meadow sloping down to a small stream across a hick is a woods of second-growth oak; elevation approximately **800** feet.

"When walking down the lane I noticed a movement along the roadside. After approaching near enough to discern the snakes, I ran home (a distance of about one city square) and returned with a flashlight and stick. When I turned the light on the snakes, this is what I saw: Possibly two-thirds of the anterior portions of the snakes' bodies were entwined vertically with the exception of a portion of the neck. The heads were opposite each other and were held horizontally, three or four inches apart. They seemed to gaze hypnotically at each other and there was a slight swaying movement between them. About one turn of coil was wound and unwound, first in a clockwise and then in a counter-clockwise direction. At no time did the distance between the heads change during the rhythmic movements, and at no time did the snakes progress along the ground. It seemed as if the posterior ends were definitely 'anchored.'

"On three distinct occasions one of the snakes broke the rhythm of the dance by darting its head rapidly at the other. The visibility was not good but I imagined the movement to be a caress, with contact made somewhere in the region of the chin of the other snake.

"What most amazed me was their utter disregard for me. I watched them from a distance of about three feet, engulfed them in the rays of the light for minutes, and yet the dance continued. From the time I first saw them until they were prodded with a stick and moved off into the underbrush, approximately twenty minutes elapsed."

Doubtless the principal and obvious reason for the scarcity of observations of this nature is the unwillingness, on the part of both specialist and layman, to take advantage of opportunities to observe such animals in the field. The one, perhaps, is too intent on capturing specimens, the other in killing "vermin." However, if courtship and mating usually are nocturnal activities—and these well may be, among crotalids and other snakes that are known to be nocturnal in certain of their activities—the difficulty of observation is increased greatly.

Studies on the copperhead in Kansas by the present writer some years ago (1934) led to the conclusion that mating in this species normally takes place in the spring. In the light of recent work on the prairie rattlesnake (Rahn, 1942, and Ludwig and Rahn, 1943), suggesting a two-year reproductive cycle, with mating in the autumn, it appears that a re-examination of existing data, and further investigation of the life histories of other crotalid snakes are greatly to be desired.

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